CLAIMS

What is claimed:

1. A phase change material having a selectable phase change temperature in a range between approximately zero degrees Celsius and four degrees Celsius comprising:

a mixture of water and deuterium oxide wherein the mole fraction of deuterium oxide is selected to provide a desired phase change temperature.

2. The phase change material of claim 1 wherein a nucleating agent is added to the mixture.

3. The phase change material of claim 1 wherein a colorant is added to the mixture.

4. The phase change material of claim 1 wherein a gel material is added to the mixture.

5. The phase change material of claim 1 wherein a temperature depression material is added to the mixture.

6. A method for using the phase change material of claim 1 for storing a temperature sensitive material in an environment requiring temperatures between approximately zero degrees Celsius and four degrees Celsius comprising:

providing a container for holding the sensitive material; and

placing the phase change material, when in a solid phase, in close proximity to the sensitive material such that the temperature of the sensitive material is maintained near the temperature of the phase change material.

7. A method of keeping a temperature sensitive material at a desired temperature between approximately zero degrees Celsius and four degrees Celsius comprising the steps of:

mixing water and deuterium oxide, wherein the mole fraction of deuterium oxide is selected so the mixture has a desired phase change temperature; and

placing the mixture close to the sensitive material so that the temperature of the sensitive material is maintained at the desired temperature.

8. The method of claim 7 wherein the sensitive material and mixture are thermally isolated from the environment.

9. The method of claim 7 wherein the sensitive material is a biomaterial.

10. A treatment pack having a phase change temperature between approximately zero degrees Celsius and four degrees Celsius comprising:

a pack for holding phase change material; and

a mixture of water and deuterium oxide having a selected mole fraction of deuterium oxide for a desired temperature wherein the mixture is placed within the pack.

11. The treatment pack of claim 10 wherein the pack is shaped to conform for a desired treatment.

12. The treatment pack of claim 10 wherein a colorant is added to the mixture.

13. The treatment pack of claim 10 wherein a gel is added to the mixture.

14. A material that changes phase at a desired temperatures between approximately zero degrees Celsius and four degrees Celsius comprising:

water; and

deuterium oxide wherein a mole fraction of deuterium oxide is chosen so that the phase change temperature of the material is the desired temperature.

15. The material of claim 14 wherein the mole fraction is chosen according to the approximate equation, desired temperature = 3.8 * mole fraction of deuterium oxide.

16. The material of claim 14 wherein the material, when in a solid phase, is crushed and serves as a slurry for surrounding a temperature sensitive material.

17. The material of claim 14 wherein the material is used in a treatment pack.

18. A mixture comprising:

water;

deuterium oxide;

a nucleating agent;

a colorant; and

a gel, wherein the deuterium oxide and the water mole fractions are chosen to provide a phase change temperature greater than approximately zero degrees Celsius and less than approximately four degrees Celsius.

19. The mixture of claim 18 wherein the mixture is used to protect temperature sensitive materials from temperatures below the phase change temperature.

20. The mixture of claim 18 wherein the mixture is used to protect temperature sensitive materials from temperatures above the phase change temperature.

21. A method for providing a phase change material having a freeze temperature close to a desired temperature, comprising the steps of:

providing water;

selecting an amount of deuterium oxide to be mixed with the water such that a mixture composed of the selected amount of deuterium oxide and the water has a phase change temperature close to the desired temperature; and

mixing the water and the selected amount of deuterium oxide thereby forming the phase change material.